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Freezers and Freezers” (incorporated by reference, see § 431.63), section 3.21, “Volume,” sections 4.1 through 4.3, “Method for Computing Total Refrigerated Volume and Total Shelf Area of Household Refrigerators and Household Wine Chillers,” and sections 5.1 through 5.3, “Method for Computing Total Refrigerated Volume and Total Shelf Area of Household Freezers.” For equipment manufactured on or after January 1, 2016, determine the volume of any covered commercial refrigerator, freezer, refrigerator-freezer, or ice-cream freezer using the method set forth in the HRF-1-2008 (incorporated by reference, see § 431.63), section 3.30, “Volume,” and sections 4.1 through 4.3, “Method for Computing Refrigerated Volume of Refrigerators, Refrigerator-Freezers, Wine Chillers and Freezers.”

[70 FR 60414, Oct. 18, 2005, as amended at 77 FR 10318, Feb. 21, 2012]

ENERGY CONSERVATION STANDARDS

§ 431.66 Energy conservation standards and their effective dates.

(a) In this section—

(1) The term “AV” means the adjusted volume (ft³) (defined as 1.63 × frozen temperature compartment volume (ft³) + chilled temperature compartment volume (ft³)) with compartment volumes measured in accordance with the Association of Home Appliance Manufacturers Standard HRF1-1979.

(2) The term “V” means the chilled or frozen compartment volume (ft³) (as defined in the Association of Home Appliance Manufacturers Standard HRF1-1979).

(3) The term “TDA” means the total display area (ft²) of the case, as defined

in the ARI Standard 1200-2006, appendix D (incorporated by reference, see § 431.63).

(b) Each commercial refrigerator, freezer, and refrigerator-freezer with a self-contained condensing unit designed for holding temperature applications manufactured on or after January 1, 2010, shall have a daily energy consumption (in kilowatt hours per day) that does not exceed the following:

Category	Maximum daily energy consumption (kilowatt hours per day)
Refrigerators with solid doors	0.10V + 2.04.
Refrigerators with transparent doors.	0.12V + 3.34.
Freezers with solid doors	0.40V + 1.38.
Freezers with transparent doors.	0.75V + 4.10.
Refrigerator/freezers with solid doors.	the greater of 0.27AV–0.71 or 0.70.

(c) Each commercial refrigerator with a self-contained condensing unit designed for pull-down temperature applications and transparent doors manufactured on or after January 1, 2010, shall have a daily energy consumption (in kilowatt hours per day) of not more than 0.126V + 3.51.

(d) Each commercial refrigerator, freezer, and refrigerator-freezer with a self-contained condensing unit and without doors; commercial refrigerator, freezer, and refrigerator-freezer with a remote condensing unit; and commercial ice-cream freezer manufactured on or after January 1, 2012, shall have a daily energy consumption (in kilowatt hours per day) that does not exceed the levels specified:

(1) For equipment other than hybrid equipment, refrigerator-freezers or wedge cases:

Equipment category	Condensing unit configuration	Equipment family	Rating temp. (°F)	Operating temp. (°F)	Equipment class designation *	Maximum daily energy consumption (kWh/day)
Remote Condensing Commercial Refrigerators and Commercial Freezers.	Remote (RC)	Vertical Open (VOP).	38 (M) 0 (L)	≥32 <32	VOP.RC.M	0.82 × TDA + 4.07
					VOP.RC.L	2.27 × TDA + 6.85
		Semivertical Open (SVO).	38 (M) 0 (L)	≥32 <32	SVO.RC.M	0.83 × TDA + 3.18
					SVO.RC.L	2.27 × TDA + 6.85
		Horizontal Open (HZO).	38 (M) 0 (L)	≥32 <32	HZO.RC.M	0.35 × TDA + 2.88
					HZO.RC.L	0.57 × TDA + 6.88
		Vertical Closed Transparent (VCT).	38 (M) 0 (L)	≥32 <32	VCT.RC.M	0.22 × TDA + 1.95
					VCT.RC.L	0.56 × TDA + 2.61

Equipment category	Condensing unit configuration	Equipment family	Rating temp. (°F)	Operating temp. (°F)	Equipment class designation *	Maximum daily energy consumption (kWh/day)
Self-Contained Commercial Refrigerators and Commercial Freezers without Doors.	Self-Contained (SC).	Horizontal Closed Transparent (HCT).	38 (M) 0 (L)	≥32 <32	HCT.RC.M HCT.RC.L	0.16 × TDA + 0.13 0.34 × TDA + 0.26
		Vertical Closed Solid (VCS).	38 (M) 0 (L)	≥32 <32	VCS.RC.M VCS.RC.L	0.11 × V + 0.26 0.23 × V + 0.54
		Horizontal Closed Solid (HCS).	38 (M) 0 (L)	≥32 <32	HCS.RC.M HCS.RC.L	0.11 × V + 0.26 0.23 × V + 0.54
		Service Over Counter (SOC).	38 (M) 0 (L)	≥32 <32	SOC.RC.M SOC.RC.L	0.51 × TDA + 0.11 1.08 × TDA + 0.22
		Vertical Open (VOP).	38 (M) 0 (L)	≥32 <32	VOP.SC.M VOP.SC.L	1.74 × TDA + 4.71 4.37 × TDA + 11.82
		Semivertical Open (SVO).	38 (M) 0 (L)	≥32 <32	SVO.SC.M SVO.SC.L	1.73 × TDA + 4.59 4.34 × TDA + 11.51
		Horizontal Open (HZO).	38 (M) 0 (L)	≥32 <32	HZO.SC.M HZO.SC.L	0.77 × TDA + 5.55 1.92 × TDA + 7.08
		Vertical Open (VOP).	– 15 (I)	≤ – 5 **	VOP.RC.I	2.89 × TDA + 8.7
		Semivertical Open (SVO).			SVO.RC.I	2.89 × TDA + 8.7
		Horizontal Open (HZO).			HZO.RC.I	0.72 × TDA + 8.74
Commercial Ice-Cream Freezers.	Remote (RC)	Vertical Closed Transparent (VCT).			VCT.RC.I	0.66 × TDA + 3.05
		Horizontal Closed Transparent (HCT).			HCT.RC.I	0.4 × TDA + 0.31
		Vertical Closed Solid (VCS).			VCS.RC.I	0.27 × V + 0.63
		Horizontal Closed Solid (HCS).			HCS.RC.I	0.27 × V + 0.63
		Service Over Counter (SVO).			SOC.RC.I	1.26 × TDA + 0.26
		Vertical Open (VOP).			VOP.SC.I	5.55 × TDA + 15.02
		Semivertical Open (SVO).			SVO.SC.I	5.52 × TDA + 14.63
		Horizontal Open (HZO).			HZO.SC.I	2.44 × TDA + 9
		Vertical Closed Transparent (VCT).			VCT.SC.I	0.67 × TDA + 3.29
		Horizontal Closed Transparent (HCT).			HCT.SC.I	0.56 × TDA + 0.43
		Vertical Closed Solid (VCS).			VCS.SC.I	0.38 × V + 0.88
		Horizontal Closed Solid (HCS).			HCS.SC.I	0.38 × V + 0.88
		Service Over Counter (SVO).			SOC.SC.I	1.76 × TDA + 0.36
	Self-Contained (SC).	Vertical Open (VOP).			VOP.SC.I	5.55 × TDA + 15.02
		Semivertical Open (SVO).			SVO.SC.I	5.52 × TDA + 14.63
		Horizontal Open (HZO).			HZO.SC.I	2.44 × TDA + 9
		Vertical Closed Transparent (VCT).			VCT.SC.I	0.67 × TDA + 3.29
		Horizontal Closed Transparent (HCT).			HCT.SC.I	0.56 × TDA + 0.43
		Vertical Closed Solid (VCS).			VCS.SC.I	0.38 × V + 0.88
		Horizontal Closed Solid (HCS).			HCS.SC.I	0.38 × V + 0.88
		Service Over Counter (SVO).			SOC.SC.I	1.76 × TDA + 0.36

* The meaning of the letters in this column is indicated in the three columns to the left.

** Ice-cream freezer is defined in 10 CFR 431.62 as a commercial freezer that is designed to operate at or below – 5 °F (– 21 °C) and that the manufacturer designs, markets, or intends for the storing, displaying, or dispensing of ice cream.

(2) For commercial refrigeration equipment with two or more compartments (*i.e.*, hybrid refrigerators, hybrid freezers, hybrid refrigerator-freezers, and non-hybrid refrigerator-freezers), the maximum daily energy consumption (MDEC) for each model shall be the sum of the MDEC values for all of

its compartments. For each compartment, measure the TDA or volume of that compartment, and determine the appropriate equipment class based on that compartment's equipment family, condensing unit configuration, and designed operating temperature. The MDEC limit for each compartment

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shall be the calculated value obtained by entering that compartment's TDA or volume into the standard equation in paragraph (d)(1) of this section for that compartment's equipment class. Measure the calculated daily energy consumption (CDEC) or total daily energy consumption (TDEC) for the entire case:

(i) For remote condensing commercial hybrid refrigerators, hybrid freezers, hybrid refrigerator-freezers, and non-hybrid refrigerator-freezers, where two or more independent condensing units each separately cool only one compartment, measure the total refrigeration load of each compartment separately according to the ARI Standard 1200-2006 test procedure (incorporated by reference, see § 431.63). Calculate compressor energy consumption (CEC) for each compartment using Table 1 in ARI Standard 1200-2006 using the saturated evaporator temperature for that compartment. The CDEC for the entire case shall be the sum of the CEC for each compartment, fan energy consumption (FEC), lighting energy consumption (LEC), anti-condensate energy consumption (AEC), defrost energy consumption (DEC), and condensate evaporator pan energy consumption (PEC) (as measured in ARI Standard 1200-2006).

(ii) For remote condensing commercial hybrid refrigerators, hybrid freezers, hybrid refrigerator-freezers, and non-hybrid refrigerator-freezers, where two or more compartments are cooled collectively by one condensing unit, measure the total refrigeration load of the entire case according to the ARI Standard 1200-2006 test procedure (incorporated by reference, see § 431.63). Calculate a weighted saturated evaporator temperature for the entire case by:

(A) Multiplying the saturated evaporator temperature of each compartment by the volume of that compartment (as measured in ARI Standard 1200-2006),

(B) Summing the resulting values for all compartments, and

(C) Dividing the resulting total by the total volume of all compartments.

Calculate the CEC for the entire case using Table 1 in ARI Standard 1200-2006 (incorporated by reference, see § 431.63),

using the total refrigeration load and the weighted average saturated evaporator temperature. The CDEC for the entire case shall be the sum of the CEC, FEC, LEC, AEC, DEC, and PEC.

(iii) For self-contained commercial hybrid refrigerators, hybrid freezers, hybrid refrigerator-freezers, and non-hybrid refrigerator-freezers, measure the TDEC for the entire case according to the ARI Standard 1200-2006 test procedure (incorporated by reference, see § 431.63).

(3) For remote-condensing and self-contained wedge cases, measure the CDEC or TDEC according to the ARI Standard 1200-2006 test procedure (incorporated by reference, see § 431.63). The MDEC for each model shall be the amount derived by incorporating into the standards equation in paragraph (d)(1) of this section for the appropriate equipment class a value for the TDA that is the product of:

(i) The vertical height of the air-curtain (or glass in a transparent door) and (ii) The largest overall width of the case, when viewed from the front.

[70 FR 60414, Oct. 18, 2005, as amended at 74 FR 1140, Jan. 9, 2009]

Subpart D—Commercial Warm Air Furnaces

SOURCE: 69 FR 61939, Oct. 21, 2004, unless otherwise noted.

§ 431.71 Purpose and scope.

This subpart contains energy conservation requirements for commercial warm air furnaces, pursuant to Part C of Title III of the Energy Policy and Conservation Act, as amended, 42 U.S.C. 6311-6317.

[69 FR 61939, Oct. 21, 2004, as amended at 70 FR 60415, Oct. 18, 2005]

§ 431.72 Definitions concerning commercial warm air furnaces.

The following definitions apply for purposes of this subpart D, and of subparts J through M of this part. Any words or terms not defined in this Section or elsewhere in this part shall be defined as provided in Section 340 of the Act.